Once upon a time...
a companion robot that can tell stories

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Abstract. In this paper we describe our approach to allow an artificial companion to read texts in an engaging way, and its evaluation. This approach consists in annotating the text with extra-information needed to personalise its narration and make it more interactive; the markup language is generic, *i.e.* it can be used to annotate any text. However we here focus on story narration to children, and identify narrative strategies tailored for this specific public and context. We give a quick overview of our ongoing implementation of a storytelling module in the Reeti expressive robot, before describing the results of two evaluations. One study concerns the acceptability of different roles of a companion robot, including storytelling, while the other concerns more specifically the believability and engagingness of our strategies.
Keywords: Interactive Storytelling, artificial companion, personalisation, engagement, believability

1 Introduction

Once upon a time, humans started telling stories to each other. Some were good at it, able to tell the story in such a way that the audience would be captivated by, or engaged in, the story. Then humans, more precisely Artificial Intelligence researchers, started creating agents that would tell stories on their behalf [1, 2]. These so-called virtual storytellers are by design able to tell stories, but the main challenge is to make them tell stories in an **engaging** way.

The concept of engagement has been studied in various situations (in work, in interactions, in games, etc), resulting in listing various requirements for an engaging situation. For instance [3] ground on Karasek's model of engagement at work to identify the three main features of an enjoyable computer-human interaction: the user should feel in **control** of the interaction (customisation, feedback, etc); the **demands** on the user should be adapted to their capabilities (*i.e.* challenging and surprising interaction but not overwhelming); and the system should **support** social interaction (*i.e.* not isolate the user). When aiming at creating an engaging virtual storyteller, there are three features that should be made engaging: the agent itself, the content of the story, and the way the story is narrated.

Regarding the **engaging story**, virtual storytelling researchers have focused on interactive stories, sort of games where the user embodies a character and gives commands to progress the story the way they want. This has been shown to be very engaging by providing the player with a feeling of *agency* [4]. However, interactive storytelling also raises a number of problems. First, giving control to the user means that the system has to deal with unexpected outputs, that might take the story into an undesired direction (known as the boundary problem [5]). Interactive storytelling systems usually allow all actions, either dealing with their consequences a posteriori, or *mediating* the actions so that threatening ones will fail (*e.g.* Mimesis [6]); an original solution was proposed in [7] where persuasion techniques are used to influence the user's actions towards what is desired. A second problem is that the user is usually expected to provide explicit commands to progress the story, which can hinder immersion in the unfolding story; [8] have developped the PINTER system [9] that exploits passive physiological feedback from the user to steer a story played as a 3D animation.

Regarding **engaging agents**, extensive work has been done in the field of Embodied Conversational Agents (ECA) to develop engaging virtual agents, that can interact naturally with human users, express appropriate emotions, or create and maintain a long-term relationship with the user. These are called relational agents [10], or companion agents [11]. Autonomous agents are already used as characters in interactive stories, pursuing their own goals and interacting together and with the human player [12]; some are endowed with emotions to make them more believable and improve immersion, for instance in a bullying scenario [13]. We believe that these relational or companion agents could be exploited not only as characters but also as engaging virtual storytellers.

Finally there has been very little work regarding **engaging narration** of a story. In [14] the authors propose stories with an arc of increasing intensity that influences events in them, so that the player does not miss important events, nor gets bored because nothing happens for too long. Human storytellers can learn various techniques for engaging narration [15]; in particular good storytellers adapt to their audience (age, interests...) [16], *i.e.* they **personalise** narration to the hearer. Companion agents are thus particularly adapted since they maintain a profile of their user that can be used to tailor the story to their needs.

In this paper we investigate this last direction: engaging narration of an existing story. We first describe our motivations and our position with respect to existing work in the fields of artificial companions and markup languages (Section 2). We then identify narrative strategies that allow an artificial companion to engage a child in a story: we describe our methodology, list our strategies (Section 3), and identify the information needed by the companion to carry them out. To provide it with this information, we rely on the SMILE markup language proposed in previous work, and describe the implementation in the Reeti expressive robot of a storytelling module exploiting SMILE-annotated stories (Section 3.4). Finally we present the results of two evaluations, one concerning the acceptability of a companion robot in different roles, and the other concerning the believability and engagingness of our strategies (Section 4). We finally conclude about prospects and future work (Section 5).

2 Our approach

Our approach consists in telling a story in a way that is not only **adapted** to the hearer and its specificities (age, personality...) and preferences, but also **personalised** by inserting comments referring to aspects of their life. To this end we want to exploit the existing capabilities of artificial companions and provide them with extra-information in the form of story annotations. Below we thus review existing work in these two fields and motivate our approach.

2.1 Artificial companions

Motivations Artificial companions were first seen as assistants, useful for their capacity to offer various services, such as managing the user's agenda to remind important events. A storytelling capability, allowing them to tell stories or read the news, is interesting for such companions because it lets them provide users with an additional service.

But one of the main qualities of an artificial companion is to **engage** its user both in the short term (in each interaction) and in the long term (over many interactions). Now it was shown [10] that to engage the user it is important to develop a relationship with them, in particular by getting to know them during open-ended conversations (chatter) and then using the information gathered to progressively personalise interaction and services. An artificial companion will thus be particularly fit to personalise storytelling by exploiting its user profile. It may also be endowed with capabilities to detect [17] or infer [18] the user's emotions, and to express its own emotions.

Related work Sabouret *et al.*. have developed the *virtual storyteller* [19], an agent able to enrich a story with engaging elements, but without personalising it; besides the story is generated from a formal scenario written by computer scientists, it is not possible to enrich an existing text (fairy tale, newspaper article) to let an artificial companion read it.

MPISTE [20] is an mobile personalised interactive narration environment; the virtual storyteller tells stories about the places visited, from its own point of view and with its own personality. However, these stories are generated from fragments created by the application developers. Besides, the domain of application (museum guide [21]) does not allow the agent to get to know the users enough to personalise narration to them, contrarily to an artificial companion that interacts regularly with the same user over an extended period of time.

[22] are interested in personalised narration in educational video games; they automatically generate a story from a set of formal atomic units, and adapt the pedagogical sequence to the user's improvement. This system thus does not allow to narrate an existing text either. Besides personalisation is only based on the user's level of competence.

Finally PAROS [23] is a system that provides personalised information (*e.g.* to a virtual museum guide) by relying on a model of the user made up of characteristics such as age, language or level of education. Narration is thus personalised to a type of users rather than to one specific user; such a categorisation is rather coarse-grained, and in particular does not take into account users' preferences or aspects of their life that an artificial companion could refer to.

2.2 Story format

Motivations The various tools for creating digital stories are not used much by writers yet; [24, p.2] review various digital narration systems before noticing that "many of (if not all) the stories mentioned above were not designed by professional writers, but by the system designers". Indeed, existing systems generally create the story based on a specification in some formal language: a set of atomic units to combine to form the story, or plans and rules enabling automatic generation of a story. This specification is easily exploitable by the narration system (*i.e.* by the virtual storyteller) but is harder to create for creative writers who are not familiar with the format. It can also hinders creativity by imposing strict formatting rules.

Besides we want to allow the artificial companion to tell existing stories (fairy tales, children books, newspapers...), while enriching them with personalised elements. What we need is thus not a formal specification language allowing to generate a story, but a markup language allowing to enrich existing texts *a posteriori* with annotations providing information useful for their personalised narration. Such XML-type markup language also have the advantage of being easy to use and easy to extend with additional tags as needed.

Limits of existing languages Various markup languagess are already used in virtual agents. AIML allows to define scripted templates of answers corresponding to patterns of expected user inputs, and is used to program *chatbots* (*e.g.* ALICE). The SAIBA standard for Embodied Conversational Agents (ECA) uses two markup languages [25] to pass information between the three modules of the internal architecture of the agent: FML (Function Markup Language) expresses the agent's communicative intention, while BML (Behaviour Markup Language) expresses the multimodal behavioural realisation of this intention.

Other languages exist that allow to annotate stories for different goals: SML [26] or ICML are used to describe the structure of the scenario from which the interactive story will be generated at runtime depending on the player's actions; [27] attach various meta-data to stories told by nuns in order to facilitate research, comparison and sharing of these stories among researchers; StoryML [28] provide an abstract description of the story that is independent from the narration device, thus enabling a distributed narration over different devices.

However, none of these languages allow the annotation of a story with the kind of meta-information we need for personalised narration by a companion.

2.3 Originality of our approach

From the work described above, the two main originalities of our work are: the ability to **narrate an existing story** rather than generate one from a formal description, thus allowing artificial companions to read news, fairy tales, or various texts; and the ability to really **personalise the narration**, not to a group or category of users, but to one specific user that the artificial companion gets to know over time.

3 Strategies for engaging storytelling

3.1 Methodology

In this paper we focus on one possible application of our approach: an artificial companion telling stories to a child. Indeed, even if we believe that the SMILE markup language is generic enough to also annotate other types of texts, the strategies in contrast have to be tailored to the target users, as well as to the actual capabilities of the intended storytelling device, here the Reeti robot[3]. Our goal is thus to find narrative strategies that allow Reeti to **engage** children.

In order to identify the relevant strategies in this context, we relied on three different sources. **First**, [29] analysed a corpus of parent-child interactions to provide a list of strategies used by adults to engage children in dialogue; they showed that parents always personalise and relate content to the child's life; such strategies can be extended to the particular type of interaction that is storytelling. **Second**, guidebooks for human storytellers (*e.g.* [15, 16]) provide valuable insight into what makes them good at telling a story ; suggested strategies include tailoring the story to the characteristics of the audience, and insist on the importance of interactivity. **Finally**, literature in the fields of human-computer interaction [3] and relational agents [10] provide important requirements for engagement that are more specific to computer systems, in particular the need for customisation, interactivity, and user control.

3.2 List of storytelling strategies

Based on these findings we selected the following narrative strategies for Reeti:

- Embody the different story characters by changing **voice**, in order to make the narration livelier;
- Adapt **vocabulary** to the child's age: replace hard words by simpler synonyms or provide their definition;
- Show emotional intelligence: **express** emotions consistent with the story, and **detect** and react to the child's emotions triggered by the story;
- Make **random** changes in the text of the story: rephrase some sections or change insignificant details to avoid boredom when retelling the story;
- Make **personal** comments referring to the child's profile and to the context, relate the story to the child's personal life;
- Offer to play **interactive** games to favour engagement: ask quiz questions about the story (during or after the story), translate some words in a foreign language, ask the child to guess what happens next...;
- Offer multiple **choices** at some points in the story: give the child this all important feeling of agency [4] by letting them decide how the story should proceed among a limited set of options that do not influence its flow;
- Insert various **diversions** in the story to prevent boredom: tell relevant jokes or anecdotes about the topic;
- Refrain from interrupting the story to **focus** on key moments (*e.g.* the climax of the story), in order not to disturb the child's immersion.

[3] Reeti by Robopec: `http://www.reeti.fr/index.php/en/`

3.3 Information needed

The behavioural realisation of these strategies by an ECA relies not only on its capabilities but also on the availability of different types of information:

- Information about the **user** (personality, preferences, personal life, history of interactions...) allowing to make personal comments and tailor the choice of type and content of diversions (quiz, jokes, anecdotes... about what topic);
- Information about the **context** (time of day, day of week, position in the house, presence of other people...) to anchor narration in the current setting;
- Information about the potential **triggers** for diversions and comments (emotional words, relevant places to insert a joke...), and conversely about the key sections that should not be interrupted, to help detect opportunities and time diversions appropriately;
- **Scripted content**: templates of comments (personal, emotional), diversions (jokes, anecdotes), questions and answers, definitions...;
- Meta-information about the **story**: emotional tone, extra information to answer potential questions, alternatives for variability (different phrasings, synonyms), alternative sequels from control points, narrative intensity.

Embodied Conversational Agents (ECA) or companion agents generally already maintain a profile of their user and a representation of the context of interaction, but the other kinds of information concern the story and have to be provided to the agent somehow. In our approach this is done by annotating the story with the markup language SMILE developed in previous work [30]. In the next section we explain our (ongoing) implementation to turn the Reeti robot into an artificial storyteller able to exploit stories annotated with SMILE.

3.4 Implementation in the Reeti robot

Reeti is an expressive communicating robot (Figure 1). It has an animated face with numerous degrees of freedom (ears, eyes, mouth, neck) and multicoloured LEDs allowing it to express different emotions. However it has no arms or legs so it cannot do any gestures or change posture. It is equipped with touch sensors on its nose and cheeks, cameras in its eyes, and a microphone, to get different forms of user input. It also has speech synthesis with adjustable voice features (speed, pitch...). It can be controlled by Urbi scripts, including remotely over TCP/IP. We used and extended a Java library that provides abstractions for the low level robot commands, and developed additional modules in Java.

First, we developed a **parser** for the SMILE language that builds the representation of the story from the annotated story file. Second, we developed a **GUI** that allows both speech input (with Google speech recognition) and text input (including for editing the text that was recognised) from the user; it is used to interact with the robot during the narration of the story, *e.g.* ask questions. Finally, we developed a first version of the **storytelling engine** that exploits the internal representation of the story and the user profile to tell the story. The robot allows interruptions by pausing between sentences to listen for user input for a given delay; if some input was received it is handled (for now it is only acknowledged), otherwise the narration is resumed.

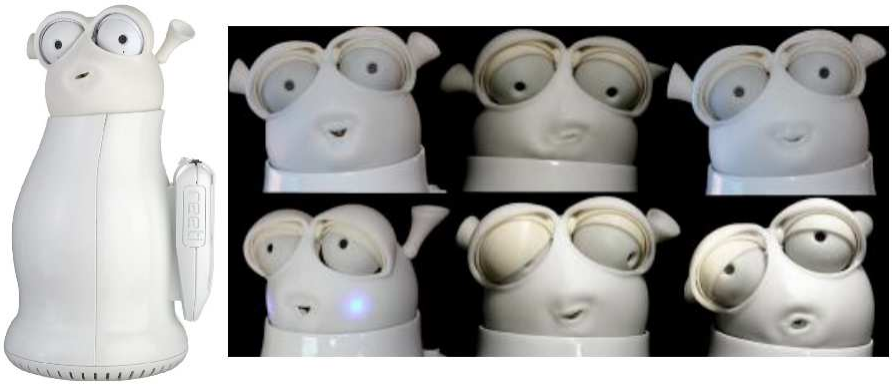

Fig. 1. The Reeti robot from Robopec: body (left) and facial expressions (right)

The implementation has thus just started and so far only one strategy was implemented: the vocal embodiment of the different characters in the story. However it already provides the basic architecture that can now be extended with additional strategies to further improve and personalise the narration. In order to evaluate our approach, and decide which strategies are most relevant and interesting to implement, we conduced some user experimentations that are described in the next section.

4 Evaluation

In this section we present two studies conduced with two different sets of users: the first one with 22 visitors of various backgrounds at a robotic show; the second one with 25 students and staff members in a computer science laboratory.

4.1 Acceptability of a companion robot

During the Innorobo robotic show (Lyon, France) we had 22 visitors play a game with two different robots (Aldebaran's Nao, and Robopec's Reeti). We then asked them how likely they were to let a companion robot play one of several possible roles with their child: being a **comforter** that the child can talk to; help the child react to **dangerous** situations; help the child with **homework**; provide **incentive** for the child to leave the computer or game console and do something more interesting, *e.g.* play sports; play **games** together; and tell **stories**. Figure 2 shows the results of this questionnaire.

We can see that most users are quite reluctant to letting a robot be a comforter, mainly because they fear that the robot would replace human relationships; this is consistent with Karasek's findings that engaging systems should support human interaction rather than isolating the user [3]. On the other hand users are mostly willing to accept a robot in the other roles, including the one of interest in this paper, storytelling.

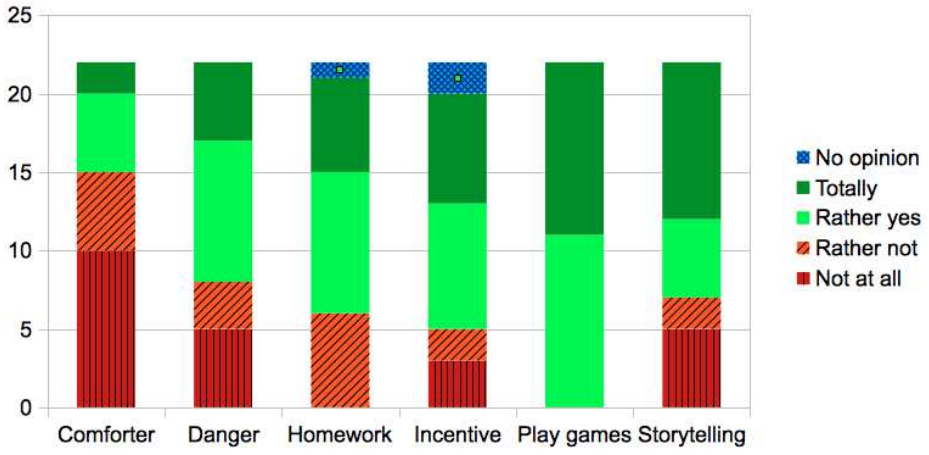

Fig. 2. Results of Innorobo questionnaire about acceptability of a companion robot in various roles with children

We can see that seven users were more or less reluctant to letting a robot tell stories to their child. Among these, some explained that the robot was too cold due to its artificial voice, and possibly scary for young children. We can also see that there is a dichotomy between users, who either completely agree or completely disagree with the storytelling role, with relatively few intermediate scores. This dichotomy can be explained by the different interpretations they made of this role. Indeed most reluctant users were parents of two or more children, and the main reason they invoked was that they did not want a robot to take away from them the bedtime story, that they consider as a privileged moment of sharing with their child. So there seems to be a clear difference of user acceptability between a playful or possibly pedagogical storyteller (telling stories during daytime, as a game or as a way to teach something) and a bedtime storyteller (involving an affective dimension). This is further confirmed by the very high acceptability of the "play games" role, and on the contrary the very low acceptability of the "comforter" role. Besides, most users also found it acceptable to let a robot help their child with homework, or encouraging him to leave the computer. This suggest that the exact role of the robot, in particular when telling stories, should be further refined so it does not feel threatening to the parents.

4.2 Believability and engagement of the strategies

We later had 25 people (students and staff at our laboratory, and some of their children) fill in a questionnaire about the narrative strategies listed above. For each strategy, they were asked to mark two criteria on a 0-10 scale: how **believable** is this strategy, *i.e.* how likely would a human storyteller be to use it? and how **engaging** is this strategy, *i.e.* how efficient is it to captivate the child? Figure 3 shows the average scores of believability and engagingness of all strategies.

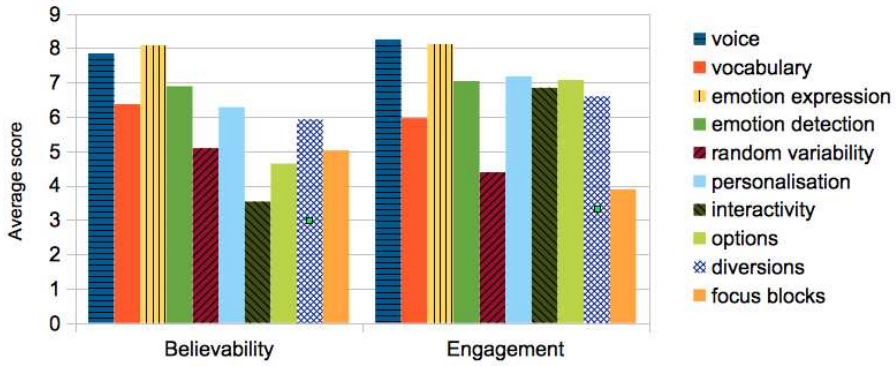

Fig. 3. Believability and potential for engagement of our strategies

When designing our strategies, we tried to make them human-like by looking into guidebooks for professional storytellers, but we also tried to design robot-specific strategies. This approach was validated by the evaluation. Indeed users judge believability as very important, with several comments advising us to look into professional storytellers performances, and one child telling that the robot should "imitate adults reading stories, because they are best at it". But users also still rate some strategies as highly engaging despite their low believability.

We can see that four strategies are not judged very believable: random variability, interactivity, options, and focus blocks. However, among these, interactivity and options are judged highly engaging; this shows that virtual storytellers should probably use strategies that are specific to them and would not be used by human storytellers; this was also suggested in the comments, where a user referred to cartoons as an example where human-likeness is certainly not necessary for believability and engagement (see also [31]). Besides, the users also insisted on the importance of **interactivity** in their comments, in particular the storyteller's ability to understand and answer the child's questions, but also to itself ask questions about the child's opinions and feelings during the story.

Regarding the other two rather unbelievable strategies, random variability was judged a bad idea because it changes the story as written by its author, and children were also said to prefer repetition with always the same words; and focus blocks were judged too "harsh" and in opposition with the very important interactivity and user control. We will take this into account when implementing the strategies into Reeti. Concretely, random variability will probably be abandoned for now, while focus blocks will be used to prevent the storyteller from proactively diverting from the story, while still allowing the child to ask questions and the robot to answer them at all times.

4.3 Storytelling roles

We can deduce from these two studies that there are several possible modes of storytelling: affective (comforter or parent telling bedtime stories); playful (like a friend or brother); and pedagogical (like a teacher). These different modes involve the use of different strategies in our list. The pedagogical mode will benefit from strategies to explain vocabulary, translate some words, or ask questions about the story. The affective mode corresponds to emotional (expressing emotions and reacting to the child's emotions) and personalisation (commenting to relate the story to the child's life) strategies. Finally the playful mode can rely on the strategies that improve interactivity, embody the characters', give multiple choices, or insert jokes or other diversions.

As shown by the results above, not all these roles are equally accepted by the different types of users. Parents are completely reluctant to being replaced in the role of the comforter, or any role involving an affective dimension, while they are likely to accept a robot as a game partner or pedagogical tutor, on condition that it is in complement of the parents and never in replacement. Children are mostly interested in a toy or game companion (they mentioned the robot being a "friend" or "like a brother that does not shout at you").

Therefore the exact role of the storyteller has to be designed so that it is not threatening to the parents, and is engaging to the children. This role should focus on telling playful stories with some added pedagogical content. As a consequence the strategies that will actually be implemented and used by the virtual storyteller should be carefully selected to match this intended role.

5 Conclusion

In this paper we presented an evaluation of our approach for turning artificial companions into engaging storytellers by using 1) the SMILE markup language to annotate stories with required information and scripted content, and 2) the abilities of companions to maintain a profile of their user and to understand and show emotions. Our focus has been on designing strategies to engage the child in the story. Although the markup language is a generic tool that could be used to annotate different kinds of texts, the strategies were tailored to the application: storytelling for children. Indeed engaging a child is very different from engaging an adult.

This problem of engaging storytelling is part of a bigger problem in AI of making **engaging** agents. The focus has long been set on getting the agents to be able to talk in an **intelligent** way (passing the famous Turing test), before moving to enabling the agents to express emotions to be more **believable**, and finally understanding and reacting to the user's emotions to be more **acceptable**. But what will get the humans to actually **use** these agents as companions, assistants, or whatever other role we set for them, and more importantly to keep using them over extended periods of time, is that these agents are not only intelligent, believable, acceptable, but also engaging. After all, we do not keep

interacting with any human being just because they are human-like, we need to develop a relationship with them. The same is true with agents [10].

This relationship can be of different types, depending on the role that the companion is to play. In our evaluation, we assessed the acceptability of several possible roles, *i.e.* several possible relationships between the user and the artificial companion, and shown that not all relationships are equally acceptable. In particular we identified three modes of storytelling, corresponding to three types of relationships: affective, pedagogical, and playful. A robotic storyteller is acceptable in a playful or pedagogical role, but the affective role is threatening to the parents who fear being replaced by a machine. The affective role is judged as being a human prerogative, but also a pleasure for the parents, who do not need nor want a robot overtaking it, and expressed strong rejection to this idea.

In the immediate future, these results will help us refine the strategies that the virtual storyteller should or should not use in order to be acceptable. But in the longer term, this also raises ethical questions as to whether we should try to have machines, be they as cute as the newest robots, elicit affective reactions in, and develop relationships with humans, in particular children.

References

1. Cavazza, M., Donokian, S., eds.: International Conference on Virtual Storytelling (ICVS). Volume 4871 of LNCS., Springer (2007)
2. Subsol, G., ed.: Int. Conf. on Virtual Storytelling. Volume 3805 of LNCS. (2005)
3. Brandtzaeg, P.B., Folstad, A., Heim, J.: Enjoyment: Lessons from karasek. In: Funology - From Usability to Enjoyment. Volume 3 of HCI., Springer (2005) 55–65
4. Murray, J.H.: Hamlet on the holodeck: the future of narrative in cyberspace. The MIT press (1998)
5. Magerko, B.: Evaluating preemptive story direction in the interactive drama architecture. Journal of Game Development **2**(3) (2007) 25–52
6. Harris, J., Young, R.: Proactive mediation in plan-based narrative environments. IEEE transactions on computational intelligence and AI in games (2010)
7. Figueiredo, R., Paiva, A.: "i want to slay that dragon!" - influencing choice in interactive storytelling. In: ICIDS. (2010)
8. Gilroy, S.W., Porteous, J., Charles, F., Cavazza, M.: Exploring passive user interaction for adaptive narratives. In: IUI. (2012)
9. Gilroy, S.W., Porteous, J., Charles, F., Cavazza, M.: Pinter: Interactive storytelling with physiological input (demo). In: IUI. (2012)
10. Bickmore, T.W., Picard, R.W.: Establishing and maintaining long-term human-computer relationships. ACM Trans. on Comp.-Human Interactions **12**(2) (2005)
11. Benyon, D., Mival, O.: Introducing the companions project: intelligent, persistent, personalised interfaces to the internet. In: BCS HCI. (2007)
12. Paul, R., Charles, D., McNeill, M., McSherry, D.: Mist: An interactive storytelling system with variable character behavior. In: ICIDS. (2010) 4–15
13. Dias, J., Paiva, A.: Agents with emotional intelligence for storytelling. In: ACII. Volume 6974 of LNCS., Springer (2011)
14. Ramsley, C., Fugere, M., Pawson, R., Rich, C., O'Donnell, D.: A simple intensity-based drama manager. In: ICIDS. (2010) 204–209
15. Greene, E.: Storytelling: Art and Technique. Libraries Unlimited (1996)

16. Hostmeyer, P., Kinsella, M.A.: Storytelling & QAR Strategies. Libr. Ultd (2011)
17. Prendinger, H., Mori, J., Ishizuka, M.: Recognizing, modeling, and responding to users' affective states. User Modeling (2005) 60–69
18. Adam, C., Herzig, A., Longin, D.: A logical formalisation of the OCC theory of emotions. Synthese **168**(2) (2009) 201–248
19. Miletitch, R., Sabouret, N., Ochs, M.: Susciter l'émotion dans la narration automatique. Technique et Science Informatiques **31**(4) (2012) 477–501
20. Delgado-Mata, C., Velazquez, R., Pooley, R., Aylett, R., Robertson, J.: MPISTE: A Mobile, Personalised, Interactive Story Telling Environment. In: Electronics, Robotics and Automotive Mechanics Conference, IEEE (2010) 243–248
21. Ibanez, J., Aylett, R., Ruiz-Rodarte, R.: Storytelling in virtual environments from a virtual guide perspective. Virtual Reality **7** (2003) 30–42
22. Kickmeier-Rust, M.D., Augustin, T., Albert, D.: Personalized storytelling for educational computer games. In: Serious Games Development and Applications. Volume 6944 of Lecture Notes in Computer Science., Springer (2011) 13–22
23. Ioannidis, Y., *et al.*: Profiling attitudes for personalized information provision. IEEE Data Engineering Bulletin **34**(2) (2011) 35–40
24. Szilas, N., Axelrad, M., Richle, U.: Propositions for innovative forms of digital interactive storytelling based on narrative theories and practices. In: Transactions on Edutainment. Volume 7145 of LNCS., Springer (2012) 161–179
25. Vilhjalmsson, H.H.: Representing communicative function and behavior in multimodal communication. In: COST 2102 School. Volume 5398 of LNCS. (2009)
26. Koenitz, H.: Extensible tools for practical experiments in idn: the advanced stories authoring and presentation system. In: ICIDS. Volume 7069 of LNCS. (2011)
27. McDaniel, R., Underberg, N.: eXeMbeLishment: using the eXtensible Markup Language as a tool for storytelling researchers. In: iDMAa 2006: CODE. (2006)
28. Hu, J., Feijs, L.: An adaptive architecture for presenting interactive media onto distributed interfaces. In: IASTED Int. Conf. on Applied Informatics. (2003)
29. Adam, C., Cavedon, L., Padgham, L.: "hello emily, how are you today?" - personalised dialogue in a toy to engage children. In: Workshop on Companionable Dialogue Systems @ ACL, Uppsala, Sweden, Association for Computational Linguistics (15 July 2010) 19–24
30. Anonymous: Anonymous. In: Anonymous. (2012)
31. Bates, J.: The role of emotion in believable agents. Communications of the ACM **37**(7) (1994) 122–125